

Substitute Specification
Attorney Docket No. 14565.0010USWO

CLAIMS

What is claimed is:

1. A method for selecting egresses of a multi-ISPs local area network, the local area network comprising a routing switch, which comprises an egress user board for processing of the ISP egresses, the method comprising the steps of:

providing a network address translation (NAT) board in the routing switch;

presetting a NAT address pool corresponding to each of the ISP egresses;

querying in a routing table upon request of an outgoing packet from the local area network, and determining a next hop of the route for the packet; and

determining whether it is necessary to perform NAT at the ISP egress corresponding to the next hop of the route; and if yes, selecting one of the NAT address pools corresponding to the ISP egress, performing corresponding NAT by the NAT board, and forwarding the packet to the egress user board corresponding to the ISP; otherwise, forwarding the packet to the egress user board corresponding to the ISP.

2. The method for selecting egresses of a multi-ISPs local area network according to claim 1, wherein the step of presetting a NAT address pool corresponding to each of the ISP egresses comprises the steps of:

binding each of outgoing interfaces connected with the ISP with a corresponding one of the NAT address pools; and

creating a NAT policy tree in accordance with combination

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of the outgoing interface and the source IP address as a keyword upon request for access, wherein leaf nodes of the NAT policy tree store binding relation between each of the outgoing interfaces connected with the ISP and the corresponding NAT address pool and the NAT policy information of the slot number of the NAT board.

3. The method for selecting egresses of a multi-ISP local area network according to claim 2, wherein the step of determining whether it is necessary to perform NAT comprises the steps of:

detecting whether there is a public network flag in the routing table item hit by the subscriber traffic;

if yes, determining whether one of the leaf nodes of the NAT policy tree is hit in accordance with the combination of the outgoing interface and the source IP address as a keyword; and

if one of the leaf nodes of the NAT policy tree is hit, determining it is necessary to perform NAT; otherwise, determining it is unnecessary to perform NAT.

4. The method for selecting egresses of a multi-ISP local area network according to claim 2, wherein the step of selecting one of the NAT address pools corresponding to the ISP egress comprises the steps of:

performing matching in the leaf nodes of the policy tree in accordance with the combination of the outgoing interface and the source IP address as a keyword; and

obtaining the address pool and the slot number of the NAT

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board from the matched leaf node of the policy tree.

5. The method for selecting egresses of a multi-ISP local area network according to claim 1, further comprising the steps of:

 classifying the routes of the local area network into a general route and a policy route, and setting a routing policy for the policy route, wherein the general route is a standby for the policy route;

 the step of querying in a routing table upon request of an outgoing packet from the local area network and determining a next hop of the route for the packet comprising the steps of:

 determining the policy route and/or the general route corresponding to the next hop;

 determining whether the policy route is available; and if available, replacing the destination address route with the policy routing result; otherwise, utilizing the destination address route of the primary general route.

6. The method for selecting egresses of a multi-ISP local area network according to claim 5, wherein the step of determining whether the policy route is available comprises the steps of:

 querying in the routing table in accordance with the next hop of the policy route; and

 determining whether the next hop can hit the 32-bit mask route corresponding to a directly-connected host; and if yes, determining the policy route is available, otherwise, determining the policy route is unavailable.

7. The method for selecting egresses of a multi-ISP local area network according to claim 5, wherein the step of determining a next hop of the route for the packet comprises the step of:

determining whether the route corresponds to a plurality of next hops; and if yes, performing traffic sharing by the plurality of corresponding ISPs.

8. The method for selecting egresses of a multi-ISP local area network according to claim 5, wherein the routing switch comprises a routing module and a NAT module completely separated from each other, wherein

the routing module determines route egress for the subscriber traffic; and

the NAT module determines whether to perform NAT and which NAT address pool to be selected.

9. The method for selecting egresses of a multi-ISP local area network according to claim 2, further comprising the steps of:

classifying the routes of the local area network into a general route and a policy route, and setting a routing policy for the policy route, wherein the general route is a standby for the policy route;

the step of querying in a routing table upon request of an outgoing packet from the local area network and determining a next hop of the route for the packet comprising the steps of:

determining the policy route and/or the general route

corresponding to the next hop;

determining whether the ISP egress corresponding to the policy route is available; and if available, replacing the destination address route with the policy routing result; otherwise, utilizing the destination address route of the primary general route.

10. The method for selecting egresses of a multi-ISP local area network according to claim 9, wherein the step of determining whether the policy route is available comprises the steps of:

querying in the routing table in accordance with the next hop of the policy route; and

determining whether the next hop can hit the 32-bit mask route corresponding to a directly-connected host; and if yes, determining the policy route is available, otherwise, determining the policy route is unavailable.

11. The method for selecting egresses of a multi-ISP local area network according to claim 9, wherein the step of determining a next hop of the route for the packet comprises the step of:

determining whether the route corresponds to a plurality of next hops; and if yes, performing traffic sharing by the plurality of corresponding ISPs.

12. The method for selecting egresses of a multi-ISP local area network according to claim 9, wherein the routing switch comprises a routing module and a NAT module completely separated

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from each other, wherein

the routing module determines route egress for the subscriber traffic; and

the NAT module determines whether to perform NAT and which NAT address pool to be selected.

13. The method for selecting egresses of a multi-ISP local area network according to claim 3, further comprising the steps of:

classifying the routes of the local area network into a general route and a policy route, and setting a routing policy for the policy route, wherein the general route is a standby for the policy route;

the step of querying in a routing table upon request of an outgoing packet from the local area network and determining a next hop of the route for the packet comprising the steps of:

determining the policy route and/or the general route corresponding to the next hop;

determining whether the ISP egress corresponding to the policy route is available; and if available, replacing the destination address route with the policy routing result; otherwise, utilizing the destination address route of the primary general route.

14. The method for selecting egresses of a multi-ISP local area network according to claim 13, wherein the step of determining whether the policy route is available comprises the steps of:

querying in the routing table in accordance with the next

hop of the policy route; and

determining whether the next hop can hit the 32-bit mask route corresponding to a directly-connected host; and if yes, determining the policy route is available, otherwise, determining the policy route is unavailable.

15. The method for selecting egresses of a multi-ISP local area network according to claim 13, wherein the step of determining a next hop of the route for the packet comprises the step of:

determining whether the route corresponds to a plurality of next hops; and if yes, performing traffic sharing by the plurality of corresponding ISPs.

16. The method for selecting egresses of a multi-ISP local area network according to claim 13, wherein the routing switch comprises a routing module and a NAT module completely separated from each other, wherein

the routing module determines route egress for the subscriber traffic; and

the NAT module determines whether to perform NAT and which NAT address pool to be selected.

17. The method for selecting egresses of a multi-ISP local area network according to claim 4, further comprising the steps of:

classifying the routes of the local area network into a general route and a policy route, and setting a routing policy for the policy route, wherein the general route is a standby

for the policy route;

the step of querying in a routing table upon request of an outgoing packet from the local area network and determining a next hop of the route for the packet comprising the steps of:

determining the policy route and/or the general route corresponding to the next hop;

determining whether the ISP egress corresponding to the policy route is available; and if available, replacing the destination address route with the policy routing result; otherwise, utilizing the destination address route of the primary general route.

18. The method for selecting egresses of a multi-ISP local area network according to claim 17, wherein the step of determining whether the policy route is available comprises the steps of:

querying in the routing table in accordance with the next hop of the policy route; and

determining whether the next hop can hit the 32-bit mask route corresponding to a directly-connected host; and if yes, determining the policy route is available, otherwise, determining the policy route is unavailable.

19. The method for selecting egresses of a multi-ISP local area network according to claim 17, wherein the step of determining a next hop of the route for the packet comprises the step of:

determining whether the route corresponds to a plurality of next hops; and if yes, performing traffic sharing by the

plurality of corresponding ISPs.

20. The method for selecting egresses of a multi-ISP local area network according to claim 17, wherein the routing switch comprises a routing module and a NAT module completely separated from each other, wherein

the routing module determines route egress for the subscriber traffic; and

the NAT module determines whether to perform NAT and which NAT address pool to be selected.